

The listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claims 1-20 (cancelled).

Claim 21 (currently amended) A method for enriching and/or identifying isotopes, comprising ~~the steps of~~:

- a) providing at least one ionization source for providing ions including two isotopes of a same element;
- b) providing an analyzer region defined by a space between at least first and second spaced apart electrodes, said analyzer region being in communication with at least one of each of a gas inlet, a gas outlet, an ion inlet and an ion outlet, and introducing said ions into said analyzer region through said ion inlet;
- c) applying an asymmetric waveform voltage and a direct current compensation voltage to at least one of said electrodes;
- d) setting said asymmetric waveform voltage in order to effect a difference in net displacement between said isotopes in the time of one cycle of said applied asymmetric waveform voltage;
- e) varying said direct current compensation voltage to compensate for some of the displacement of said isotopes resulting from the applied asymmetric waveform voltage and measuring resulting transmitted ions at said ion outlet, so as to produce a compensation voltage scan for said transmitted ions;
- f) identifying peaks in said compensation voltage scan corresponding to said isotopes; and,
- g) setting said direct current compensation voltage to correspond to one of said peaks, so as to separate and enrich one of said two isotopes.

Claim 22 (previously presented) The method claimed in claim 21, which includes operating substantially at atmospheric pressure and substantially at room temperature.

Claim 23 (previously presented) The method claimed in claim 21, which includes generating said ions for said source of ions by electrospray ionization.

Claim 24 (previously presented) The method claimed in claim 21, which includes detecting said transmitted ions by mass spectrometry.

Claim 25 (previously presented) The method claimed in claim 22, which includes detecting said transmitted ions by mass spectrometry.

Claim 26 (previously presented) The method claimed in claim 23, which includes detecting said transmitted ions by mass spectrometry.

Claim 27 (previously presented) The method claimed in claim 24, which includes subjecting the transmitted ions to a mass analysis scan to provide ion intensity data over a selected range of mass to charge ratios.

Claim 28 (previously presented) The method claimed in claim 21, which includes providing a gas flow through said analyzer region, so as to transport said ions along said analyzer region.

Claim 29 (previously presented) The method claimed in claim 21, which includes collecting the desired one of said two isotopes for further processing.

Claim 30 (currently amended) A method for enriching and/or identifying ions of differing isotopic composition, comprising ~~the steps of:~~

- h) a) providing at least one ionization source for producing ions including two ions of differing isotopic composition;
- i) b) providing an analyzer region defined by a space between at least first and second spaced apart electrodes, said analyzer region being in communication

- with at least one of each of a gas inlet, a gas outlet, an ion inlet and an ion outlet,
and introducing said ions into said analyzer region through said ion inlet;
- j) c) applying an asymmetric waveform voltage and a direct current compensation voltage to at least one of said electrodes;
- k) d) setting said asymmetric waveform voltage in order to effect a difference in net displacement between said two ions of differing isotopic composition in the time of one cycle of said applied asymmetric waveform voltage; and,
- l) e) setting said direct current compensation voltage to a determined value to separate and enrich only one of said two ions of differing isotopic composition.

Claim 31 (previously presented) The method claimed in claim 30, which includes operating substantially at atmospheric pressure and substantially at room temperature.

Claim 32 (previously presented) The method claimed in claim 30, wherein, said ions introduced into said ion inlet are produced by electrospray ionization.

Claim 33 (previously presented) The method claimed in claim 30, which includes detecting said transmitted ions by mass spectrometry.

Claim 34 (previously presented) The method claimed in claim 33, which includes subjecting the transmitted ions to a mass analysis scan to provide ion intensity data over a selected range of mass to charge ratios.

Claim 35 (previously presented) The method claimed in claim 30, which includes providing a gas flow through said analyzer region, so as to transport said ions along said analyzer region.

Claim 36 (previously presented) The method claimed in claim 30, which includes collecting the desired one of said two ions of differing isotopic composition for further processing.

Claim 37 (currently amended) The method claimed in claim 30, including ~~the additional~~
~~steps~~ prior to setting said direct current compensation voltage to a determined value ~~step~~
~~e) of:~~

- d1) varying said direct current compensation voltage to compensate for some of the displacement of one of said ions of differing isotopic composition resulting from the applied asymmetric waveform voltage and measuring resulting transmitted ions at said ion outlet, so as to produce a compensation voltage scan for said transmitted ions of different isotopic composition; and,
- d2) identifying peaks in said compensation voltage scan corresponding to said ions of different isotopic composition.